

WHAT IS CLAIMED IS:

1. A vertical cavity surface emitting laser, comprising:

an optical cavity adjacent a first mirror;

5 an emitting mirror adjacent said optical cavity;

a mode defining aperture for controlling transverse modes; and

an absorbing layer integrated within the emitting mirror, wherein said absorbing layer is laterally located  
10 within at least a portion of said mode defining aperture.

2. The vertical cavity surface emitting laser of claim 1 wherein said absorbing layer comprises a layer of conductive material.  
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3. The vertical cavity surface emitting laser of claim 2 wherein said conductive material comprises titanium.

20 4. The vertical cavity surface emitting laser of claim 1 wherein said absorbing layer comprises a layer of semiconductor material.

5. The vertical cavity surface emitting laser of claim 4 wherein said semiconductor material is doped p-type.  
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6. The vertical cavity surface emitting laser of claim 4 wherein the semiconductor material is a narrow bandgap material, and wherein an absorption edge of said  
30 semiconductor material is at a longer wavelength than

emission wavelength of said vertical cavity surface emitting laser.

7. The vertical cavity surface emitting laser of claim 1 wherein said emitting mirror comprises a DBR having a plurality of mirror periods.

8. The vertical cavity surface emitting laser of claim 7 wherein said absorbing layer is formed at or near a null in optical standing wave intensity pattern in closest proximity to an emission facet.

9. The vertical cavity surface emitting laser of claim 1 wherein said upper ohmic contact comprises an intracavity contact coupled to the optical cavity.

10. The vertical cavity surface emitting laser of claim 9 wherein said emitting mirror comprises a dielectric DBR having a plurality of mirror periods.

11. The vertical cavity surface emitting laser of claim 10 wherein optical thickness of mirror period containing said absorbing layer does not equal optical thickness of remaining mirror periods.

12. The vertical cavity surface emitting laser of claim 11 wherein said absorbing layer is formed at or near a null in optical standing wave intensity pattern in closest proximity to an emission facet.

13. The vertical cavity surface emitting laser of claim 12 wherein said absorbing layer comprises a layer of conductive material.

5        14. The vertical cavity surface emitting laser of claim 13 wherein said conductive material comprises titanium.

10       15. The vertical cavity surface emitting laser of claim 1 wherein said emitting mirror comprises a hybrid mirror having a semiconductor portion and a dielectric portion.

15       16. The vertical cavity surface emitting laser of claim 15 wherein said absorbing layer is integrated within said dielectric portion.

20       17. The vertical cavity surface emitting laser of claim 16 wherein said absorbing layer is formed at or near a standing wave null in optical intensity pattern that is closest to an emission facet.

25       18. The vertical cavity surface emitting laser of claim 17 wherein said absorbing layer comprises a layer of conductive material.

30       19. The vertical cavity surface emitting laser of claim 17 wherein said conductive material comprises titanium.

20. A vertical cavity surface emitting laser, comprising:

an optical cavity adjacent a first mirror;  
a semiconductor emitting mirror adjacent said optical  
cavity; and  
an absorbing layer integrated within the emitting  
5 mirror.

21. The vertical cavity surface emitting laser of  
claim 20 wherein said absorbing layer comprises a layer of  
semiconductor material.

22. The vertical cavity surface emitting laser of  
claim 21 wherein said semiconductor material is doped p-  
type.

23. The vertical cavity surface emitting laser of  
claim 21 wherein the semiconductor material is a narrow  
bandgap material, and wherein an absorption edge of said  
semiconductor material is at a longer wavelength than  
emission wavelength of said vertical cavity surface  
20 emitting laser.

24. The vertical cavity surface emitting laser of  
claim 20 wherein said absorbing layer is formed at or near  
a null in optical standing wave intensity pattern in  
25 closest proximity to an emission facet.

25. A method for reducing external feedback in a  
vertical cavity surface emitting laser, comprising:

determining optimum thickness of at least one of a  
30 plurality of high index layers in a first emitting mirror  
of a first VCSEL in accordance with air side reflectivity  
of said first VCSEL;

determining optimum thickness of an absorbing layer in a second emission mirror of a second VCSEL in accordance with air side reflectivity of said second VCSEL using said optimum thickness of said high index layers; and

- 5       determining optimum thickness of at least one of a plurality of low index of refraction layers in a third emission mirror of a third VCSEL in accordance with air side reflectivity of said third VCSEL using said optimum thickness of said high index layers and said optimum
- 10   thickness of said absorbing layer.